

Check list of Bulgarian carrion beetles (Coleoptera: Silphidae)

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Abstract. A bibliographical review of Bulgarian carrion beetles has been made. Besides, more than 370 new finds from over 200 localities have been added to 21 species. Five of them, being rare species or species long ago cited (*Aclypea opaca* (Linnaeus, 1758), *Necrodes littoralis* (Linnaeus, 1758), *Silpha olivieri* Bedel, 1887, *Nicrophorus antennatus* (Reitter, 1884) and *Nicrophorus sepulchralis* Heer, 1841), are confirmed for the country. Two species, the West-Mediterranean *Silpha puncticollis* Lucas, 1846 and the East-Mediterranean *Ablattaria arenaria* (Kraatz, 1876), are excluded from the list. The latter one is indicated (in the literature) as occurring in the East Balkans without exact locality. Except for it, *Silpha tristis* Illiger, 1798 and *Thanatophilus dispar* (Herbst, 1793), known from single records, need further confirmation. As a result, 23 carrion beetles have been reliably established in Bulgaria. The chorotypes of all species and subspecies are given.

Key words: Coleoptera, Silphidae, check list, Bulgaria, Palaeartic region.

Introduction

Carrion beetles is a small group with approximately 200, mostly necrophagous, species worldwide (NEWTON, 1991). The first faunistic announcements on carrion beetles in Bulgaria date back to the end of 19th and beginning of 20th century - BASSANOVICH (1891), HRISTOVICH (1892), IOAKIMOV (1899; 1904), MARKOVICH (1904; 1909), KOVACHEV (1905), NEDELKOV (1905; 1909), ANONYMOUS (1907), and NETOLITZKY (1912). Later, new information was given in the works of MÜLLER (1929), ROUBAL (1931; 1934), DRENOWSKI (1932), PAPAŽOV (1934a), PANIN (1941), and CSIKI (1943). In the second half of the century new data was added by ANGELOV (1960; 1964; 1965; 1968; 1986), SCHAWALLER (1979; 1980; 1981; 1996), GUÉORGUIEV (1990). GUÉORGUIEV et al. (1993) confirmed data by previous authors, listing only five rare species. Giving data on some beetles - intermediate hosts of helminthes, GENOV & BILY (1980) noted several carrion beetles with concrete topographic

data. Later, KODZHABASHEV & PENEV (1998) repeated their data. Finally, GUÉORGUIEV (2001) mentioned three species, new for the Kresna Gorge. As a result, the faunistic information in the various contributions (mostly in Bulgarian) is sufficient, as most of it, excluding the present contribution, could be found in PAPAŽOV (1934a). A short note, made by the same author (PAPAŽOV, 1934b), recorded some species most of which had been incorrectly published in previous Bulgarian papers. The same note does not contain faunistic data, so that interesting announcements about several rare species like *Thanatophilus dispar* and *Nicrophorus sepulchralis* seem lost. As a whole, the determination of the species is comparatively easy and for the Bulgarian amateurs the key of Papazov seems reliable (PAPAŽOV, 1934a). Records on three carrion beetles, wood and agricultural pests, are listed in BURESCH & LAZAROV (1956), as concrete localities for them are cited in the following papers (MALKOV, 1904; 1907; TSCHORBADJIEV, 1924; 1932; DRENSKY, 1930; 1931; ANONYMOUS, 1945).

The present paper has as its objectives: (i) to add new revised material, not released until now; (ii) to systematize all literature sources published till now; and (iii) to show the present state of knowledge and the problems concerning the group in Bulgaria.

Material and methods

Most of the new data was found out among the archive of Vassil Guéorguiev. The material has been accumulated in the collection of the National Museum of Natural History - Sofia (NMNHS) during the entire 20 century and was determined by him. This material is cited further in the text without mention of its deposition. Except in arranging of these new data, the contribution of the senior author hereby includes also a revision of some specimens of the genera *Aclypea*, *Dendroxena*, *Nicrophorus*, *Silpha*, and *Thanatophilus*.

Various Czech entomologists, visiting Bulgaria in 1963-2001, collected further material, determined or reviewed by the junior author. This material is deposited in several private and public collections; the following acronyms for their indication are used together with the material cited below: AH - private collection of A. Holub, České Budějovice; AO - private collection of A. Olexa, Praha; JC - private collection of J. Čech, České Budějovice; JHA - private collection of J. Háva, Praha; JHO - private collection of J. Horák, Praha; JJ - private collection of J. Jurčiček, Praha; JK - private collection of J. Kohout, Roudnice nad Labem; JM - private collection of J. Mašek, Žlutice; JP - private collection of J. Prouza, Hradec Králové; JRE - private collection of J. Rejsek, Poděbrady; JRU - private collection of J. Růžička, Praha; JSC - private collection of J. Schneider, Praha; JST - private collection of J. Stanovský, Ostrava; KO - private collection of K. Orszulik, Frýdek-Místek; NMB - Naturhistorisches Museum, Basel (M. Brancucci); MMB - Moravské muzeum, Brno (P. Lauterer, J. Kolibáč); MCL - Okresní muzeum, Česká Lípa (M. Honců); MH - private collection of M. Havlas, Opava; MK - private

collection of M. Kuboň, Ostrava; MS - private collection of M. Snížek, České Budějovice; MT - private collection of M. Trýzna, Děčín; OK - private collection of O. Kapler, Praha; RN - private collection of R. Nerger, Čelakovice; RR - private collection of R. Rous, Praha; SL - private collection of S. Laibner, Choceň; SNM - Slovenské národné múzeum, Bratislava (I. Okáli, V. Janský); TL - private collection of T. Lackner, Košice; VK - private collection of V. Karas, Veselí nad Lužnicí; VM - private collection of V. Mikuda, České Budějovice; ZC - private collection of Z. Černý, Mírovce; ZK - private collection of Z. Kačenka, Roudnice nad Labem; ZMA - private collection of Z. Malinka, Opava; ZMHB - Zoologisches Museum der Humboldt-Universität, Berlin (F. Hieke, M. Uhlig); ZZ - private collection of Z. Znamenáček, Praha.

Both authors made the occasional comments on most of the species. Genera and species within the subfamilies Silphinae and Nicrophorinae are sorted alphabetically. Material of each species within geographical units is sorted chronologically. Only the junior synonyms of species names are given throughout the mentioned references. The subfamily Agyrtinae, included within Silphidae in the past, is now a separate family in the modern classification of beetles (NEWTON & THAYER, 1992).

Systematic part

SILPHINAE

Ablattaria Reitter, 1885

{*Ablattaria arenaria* (Kraatz, 1876): SCHAWALLER (1979: 7 & Abb. 1). The occurrence of this East-Mediterranean species in Bulgaria is questionable. The map in the above mentioned paper cannot to be a reliable evidence for its presence in the country. Although *A. arenaria* probably occurs in the country, without exact faunistic data for the time being, the species has better not be included in the list of Bulgarian carrion beetles.}

Ablattaria laevigata (Fabricius, 1775)

(? = *laevigata gibba* Brullé, 1832; ? *laevigata meridionalis* Ganglbauer, 1899)

Silpha laevigata Fabricius: ROUBAL (1931: 362); ANGELOV (1964: 309); ANGELOV (1965: 133). *Silpha laevigata* var. *gibba*: NEDELKOV (1905: 437). *Ablattaria laevigata* var. *gibba*: DRENOWSKI (1932: 25); PAPAŽOV (1934a: 198). *Ablattaria laevigata*: PAPAŽOV (1934a: 197); PAPAŽOV (1934b: 221); PANIN (1941: 549); ANGELOV (1986: 63). *Ablattaria laevigata* var. *meridionalis*: CSIKI (1943: 215). *Ablattaria laevigata gibba*: SCHAWALLER (1979, Abb. 1).

NEW DATA: Danube Plain: Razgrad, V.1905, A. Markovich leg. (1 ex. sub *Silpha reticulata* F.); Cherven, VI.1989, S. Bečvář leg. (5 ex., JRU); Novi Pazar, 20.VII.1989, M. Kuboň leg. (1 ex., MK). **Predbalkan:** Smirnenki Dam near Montana, 20.VII.1980 (1 ex.). **Vitosha Mtn.:** Klادنitsa, 31.V.1981, D.

Bocharov leg. (1 ex.). **Zemenska planina Mtn.:** 10 km W Zemen, 21.-23.VI.1983, F. Hieke leg. (1 ex., ZMHB). **Ograzhden Mtn.:** dam near Sestrino, 6.IV.1983, J. Ganey leg. (1 ex.). **Middle Struma Valley:** Melnik, 27.VI.1982, M. Snížek leg. (1 ex., MS); Chotovo, 27.IV.1988, R. Červenka leg. (2 ex., JSC). **Slavyanka Mtn.:** Petrovo, 23.VII.1930, P. Drenski leg. (2 ex.); below Tsarev Vrah Peak, 1200 m, 29.VI.1937, P. Drenski leg. (3 ex.); 14.VI.1938, 1490 m, I. Zonkov leg. (1 ex.). **Thracean Lowland:** Plovdiv, 20.VII.1991, Z. Kadlec leg. (1 ex., ZMA). **Strandzha Mtn.:** Zvezdec env., 700 m, no date, I. Smatana leg. (3 ex., JRU). **Black Sea Coast:** Varna, no date, Laco leg. (3 ex., SNM); Zvezditsa, 2.V.1949, N. Karnozhitsky leg. (3 ex.); Beloslav (= former Gebedzhe), 15.V.1952, N. Karnozhitsky leg. (1 ex.); Sea Garden in Varna, 26.IV.1954, N. Karnozhitsky leg. (2 ex.); place "Gyunduz" near Varna, 2.V.1954, N. Karnozhitsky leg. (3 ex.); Sluntchev Bryag, 7.VIII.1964, K. Pospíšil leg. (1 ex., MMB); same locality, 9.VI.1964, K. Pospíšil leg. (1 ex., MMB); same locality, 25.VIII.1976, L. Pospíšilová leg. (1 ex., MMB); Sozopol, VIII.1965, J. Král leg. (2 ex., JRU); same locality, 15.VII.1969, V. Karas leg. (1 ex., VK); same locality, VI.1971, A. Olexa leg. (1 ex., AO); same locality, 1971, J. Král leg. (1 ex., JRU); same locality, 4.VII.1977, V. Karas leg. (1 ex., VK); same locality, 6.VII.1977, V. Karas leg. (1 ex., VK); same locality, 7.VIII.1979, D. Bocharov leg. (1 ex.); same locality, 9.VII.1980, L. Mencl leg. (1 ex., JRU); same locality, 20.VII.1981, M. Kuboň leg. (1 ex., MK); same locality, 12.VI.1984, R. Řiha leg. (1 ex., MCL); same locality, 6.V.1985, M. Kuboň leg. (1 ex., MK); same locality, 19.IX.1987, no collector's name (1 ex., TL); Albena, 11.VII.1967, Lát leg. (1 ex., MCL); same locality, VIII.1976, Secký leg. (1 ex., VK); same locality, 2.VI.1990, J. Batelka leg. (1 ex., RN); Arkutino, VII.1970, A. Olexa leg. (1 ex., AO); same locality, 18.VI.1985, M. Vrba leg. (1 ex., VM); Burgas, 23.VI.1975, Z. Kačénka leg. (1 ex., ZK); Burgas env., seacoast, 18.VII.1981, B. Jaeger leg. (1 ex., ZMHB); Primorsko, 20.IX.1975, P. Pecina leg. (1 ex., JRU); same locality, 20.IX.1975, P. Pecina leg. (1 ex., JRU); same locality, VII.1976, J. Jurčiček leg. (1 ex., JJ); same locality, 20.VI.1988, M. Janata leg. (1 ex., JRU); same locality, 2.VII.1989, M. Trýzna leg. (2 ex., MT); Kiten, 11.VII.1977, V. Karas leg. (1 ex., VK); same locality, 6.VII.1986, J. Mička leg. (1 ex., JRU); Lozenets, 11.VII.1978, S. Laibner leg. (1 ex., SL); same locality, 27.VI.1982, M. Snížek leg. (1 ex., MS); same locality, 10.VII.1982, M. Snížek leg. (1 ex., MS); same locality, 7.VII.1986, V. Karas leg. (1 ex., VK); same locality, 29.VI.1987, M. Šárovec leg. (1 ex., JRU); Lozenec env., VII.1971, J. Boháč leg. (1 ex., JRU); same locality, 1.VII.1983, R. Čermák leg. (3 ex., ZZ); Michurin, 20.VII.1978, M. Konrád leg. (1 ex., JRU); same locality, 23.VI.1982, S. Bílý leg. (1 ex., JRU); Vlas, VII.1982, Hubálek leg. (1 ex., JP); Kosharica, VI.1984, Z. Černý leg. (1 ex., ZC); Chernomorets, 19.VI.1984, J. Kohout leg. (2 ex., JK); Obzor, 26.-27.VI.1984, M. Snížek leg. (1 ex., MS); Bjala, VII.1984, Wachtl leg. (1 ex., MT); same locality, 15.VI.1986, A. Holub leg. (1 ex., AH); same locality, VII.1986, V. Novák leg. (1 ex., MT); Kamen Bryag, 11.VII.1984, J. Růžička leg. (1 ex., JRU); Kranevo, 10.VII.1987, Gebauerová leg. (1 ex., ZMA); Nesebar, VI.1988, Z. Černý leg. (2 ex., ZC); Pomorie, 20.-25.VIII.1989, Z. Jindra leg. (1 ex., MT).

Collections are in IV-IX. Variable, polymorphic species (SCHAWALLER, 1979), taxonomic status of *A. laevigata gibba* (Brullé, 1832) and *A. laevigata*

meridionalis Ganglbauer, 1899 is not clear and needs further study (J. Růžička, unpubl.). Larger, more vaulted specimens, attributed to these subspecies are known from South-East Europe, Crimea, Crete, Cyprus to Asia Minor (PORTEVIN, 1926; SCHAWALLER, 1979, Abb. 1).

***Aclypea* Reitter, 1884 (= *Blitophaga* Reitter, 1884)**

***Aclypea opaca* (Linnaeus, 1758)**

Aclypea opaca: MALKOV (1907); BURESCH & LAZAROV (1956: 129). *Silpha opaca*: BURESCH & LAZAROV (1956: 129). *Blitophaga opaca*: GUÉORGUIEV et al. (1993: 295).

NEW DATA: Black Sea Coast: Varna, VIII.1979, K. Deneš leg. (1 ex., MS).

Collection only in VIII. Holarctic species (PORTEVIN, 1926; SCHAWALLER, 1996). *A. opaca* was cited by MALKOV (1907) as a beetroot pest from Sadovo, and by other authors as a maize pest without exact localities. According to SCHAWALLER (1996, Abb. 25) it lives in the North Balkans. Undoubtedly, it is a rare Bulgarian species (GUÉORGUIEV et al., 1993), a single new record confirms its occurrence in Bulgaria (Fig. 1).

***Aclypea undata* (O. F. Müller, 1776)**

(= *reticulata* Fabricius, 1787; *verrucosa* Ménétriés, 1832; *nitidior* Portevin, 1926)

Silpha reticulata: IOAKIMOV (1904: 13); MARKOVICH (1904: 237); KOVACHEV (1905: 6); NEDELKOV (1905: 437); ANONYMOUS (1907: 296); MARKOVICH (1909: 7).



Fig. 1. Localities of *Aclypea opaca* (Linnaeus) in Bulgaria

Silpha undata: KOVACHEV (1905: 6). *Silpha verrucosa*: ANONYMOUS (1907: 296). *Blitophaga undata*: MÜLLER (1929: 8); GUÉORGUIEV (1990: 137). *Aclypea undata* var. *nitidior*: ROUBAL (1934: 43); *Aclypea undata*: PAPAŽOV (1934a: 193); CSIKI (1943: 215); ANGELOV (1960: 24); ANGELOV (1964: 309); ANGELOV (1986: 62-63); SCHAWALLER (1996: 13).

NEW DATA: Danube Plain: Provadiya, 20.V.1930, D. Ioakimov leg. (3 ex.). **Lyulin Mtn.:** 25.IV.1952, S. Minkova leg. (3 ex.). **Sofia Region:** Sofia, Faculty of Agronomy, 17.VI.1923 (1 ex.); Novi Iskar (= former Kurilo), 13.IV.1952, D. Bocharov leg. (1 ex.). **Vitosha Mtn.:** Vladaya, 2.V.1951, D. Bocharov leg. (3 ex.); place "Karlezha", 25.V.1951, A. Kostova leg. (1 ex.); Knyazhevo, 5.VI.1951, B. Zaharieva leg. (5 ex.). **Transbalkan Region:** Karlovo, 15.VI.1951, S. Minkova leg. (1 ex.). **Upper Struma Valley:** Radomir, IV.-V.1957, S. Minkova leg. (7 ex.). **Rila Mtn.:** Kostenets, 15.VI.1931, Trifonov leg. (1 ex.); Rilski manastir, 16.IX.1981, M. Kuboň leg. (1 ex., MK); same locality, 23.VI.1993, A. Hamet leg. (1 ex., MT). **Pirin Mtn.:** Cherna Voda, no date, B. Kouřil leg. (1 ex., SNM, coll. Roubal). **West Rhodopes Mts.:** Chepelare, 2.VI.1902, V. Iliev leg. (1 ex.); Persenk Peak, 18.VI.1938, D. Papazov leg. (1 ex.). **Black Sea Coast:** Varna, 1.IV.1943, N. Karnozhitsky leg. (9 ex.); Nos Emine Cap env., VI.1968, R. Rous leg. (2 ex., RR); Burgas, VI.1968, R. Rous leg. (1 ex., RR).

Collections are in III-VIII. Known from Europe, Asia Minor, the Caucasus to Iran and West Siberia (PORTEVIN, 1926; SCHAWALLER, 1996).

Dendroxena Motschulsky, 1858 (= *Xylodrepa* C. G. Thompson, 1859)

Dendroxena quadrimaculata (Scopoli, 1772)

(= *quadripunctata* Schreber, 1759, nec Linnaeus, 1758)

Silpha quadripunctata: IOAKIMOV (1904: 13); KOVACHEV (1905: 6); MARKOVICH (1904: 237); NEDELKOV (1905: 437); ANONYMOUS (1907: 296); MARKOVICH (1909: 6). *Xylodrepa quadripunctata*: PAPAŽOV (1934a: 194); ANGELOV (1960: 24); ANGELOV (1964: 309); ANGELOV (1965: 133); ANGELOV (1986: 63).

NEW DATA: South Dobrogea: 20 km E from Dobrich, 4.V.-19.VI.1987, L. Penev leg. (3 ex.). **Lyulin Mtn.:** 11.V.1947, D. Bocharov leg. (1 ex.). **Sofia Region:** Sofia, 15.V.1955, D. Bocharov leg. (2 ex.). **Vitosha Mtn.:** 8.VII.1945, A. Valkanov leg. (1 ex.); Vladaya, 24.V.1950, D. Bocharov leg. (3 ex.); Bistritsa, 30.V.1982, L. Penev leg. (1 ex.). **Lozenska planina Mtn.:** Dolni Pasarel, 1.VI.1980, Kiryakov leg. (4 ex.); German, 800 m, 9.V.1996, B. Guéorguiev leg. (1 ex.). **Transbalkan Region:** Buzovgrad, 10.V.1948, D. Bocharov leg. (1 ex.). **Rila Mtn.:** Rilski manastir, 1200-2000 m, VII.1976, D. Wrase leg. (1 ex., ZMHB). **West Rhodopes Mts.:** Bachkovski manastir, VI.1956, I. Belog leg. (1 ex.). **East Rhodopes Mts.:** Topolovo, V.1986, Wachtl leg. (1 ex., MT). **Black Sea Coast:** place "Gyunduz", 18.VII.1943, (1 ex.); same locality, 30.V.1948, (1 ex.); same locality, 14.VI.1953 (2 ex.); same locality, 23.V.1954, all N. Karnozhitsky leg. (13 ex.); Sozopol, VII.1981, M. Havlas leg. (1 ex., MH); Arkutino, V.1985, Kadlec and Voříšek leg. (2 ex., JHA); Ahtopol, 12.VII.1989, M. Kuboň leg. (1 ex., MK).

Collections are in IV-VII. Europe, the Caucasus to West Siberia (PORTEVIN, 1926; NIKOLAEV & KOZMINYKH, 2002). The nomenclature problems concerning the use of the name *Silpha quadripunctata* were reviewed by MADGE & POPE (1970).

Necrodes Leach, 1815

Necrodes littoralis (Linnaeus, 1758)

Necrodes littoralis: PAPAŽOV (1934a: 191); GUÉORGUIEV et. al. (1993: 295).

NEW DATA: Predbalkan: Smirnenki Dam near Montana, 20.VII.1980. **West Stara planina Mts.:** Petrohan Pass, 8-20.VIII.1976, J. Ganev leg. (7 ex.); chalet Lyulyaka, 25.IX.1979. **Central Stara planina Mts.:** chalet Planinets, 1020 m, 2.VII.1984, J. Růžička leg. (1 ex., JRU). **Vitosha Mtn.:** place "Bunkera", 9.V.1976; same locality, 9.VIII.1977; same locality, 30.IX.1978. **Lozenska Planina Mtn.:** Kokalyane, 2.IV.1961, D. Bocharov leg. (1 ex.). **Zemenska planina Mtn.:** Skakavitsa, 10.IX.1978. **Osogovo Mtn.:** chalet Studen Kladenets, 1350 m, 3.VII.1976; chalet Osogovo, 1640 m, 18.VI.1979. **Rila Mtn.:** chalet Skakavitsa, 1870 m, 16.VII.1980. **Ograzhden Mtn.:** Sestrino, 650 m, 23.IV.1983; Markovi Kladentsi Peak, 1450 m, 6.VII.1983. **Middle Struma Valley:** Melnik, 14.VI.1977, D. Bocharov leg. (1 ex.); Kozhuh, 20.IV.1982; Kresna env., 2.V.2001, M. Žemlička leg. (1 ex., JRU). **West Rhodopes Mts.:** Chepelare, 26.VI.1976; same locality, 18.V.1977; Rozhen, 4.VI.1981. **East Rhodopes Mts.:** chalet Belite Brezi, 13.V.1976. **Strandzha Mtn.:** 28.VI.1973, S. Zagorchinov leg. (5 ex.); Malko Tarnovo, 30.VII.1983; place "Kachul" near Gramatikovo, 1.VIII.1983. **Black Sea Coast:** Varna, 13.VIII.1944, N. Karnozhitsky leg. (1 ex.); Ropotamo, 10.VII.1971, J. Čech leg. (1 ex., JC); Arkutino, 21.VI.1978, Radikovský leg. (1 ex., JRU); same locality, 28.VII.1983; Ahtopol, 10.VII.1985, O. Kapler leg. (1 ex., JRU).

Collections are in IV-IX. Transpalaeartic species distributed from Europe to Japan (PORTEVIN, 1926; NIKOLAEV & KOZMINYKH, 2002). *N. littoralis* was cited as rare species for Bulgaria (GUÉORGUIEV et. al., 1993). However, the numerous new data mentioned here refute this opinion (Fig. 2). Its seeming rarity in collections can be explained particularly by the fact that *N. littoralis* is attracted mostly to large carcasses and thus usually not collected by pitfall traps. The more considerable part of the new material was collected by means of light traps.

Oiceoptoma Leach, 1815

Oiceoptoma thoracicum (Linnaeus, 1758)

Pseudopelta thorasica (sic!): IOAKIMOV (1904: 13). *Silpha thoracica*: NEDELKOV (1905: 437). *Oiceoptoma thoracicum*: PAPAŽOV (1934a: 192); ANGELOV (1965: 133). *Oiceoptoma thorasica*: ANGELOV (1968: 142); ANGELOV (1986: 62); GUÉORGUIEV (2001: 170).

NEW DATA: Danube Plain: Ruse, Topchii, 18.VI.1943, A. Valkanov leg. (6 ex.). **West Stara planina Mts.:** Petrohan Pass, 20.VI.1976, J. Ganev leg. (2 ex.). **Vitosha Mtn.:** Zlatni Mostove, 7.VI.1946 (2 ex.); Vladaya, 6.V.1952, D.

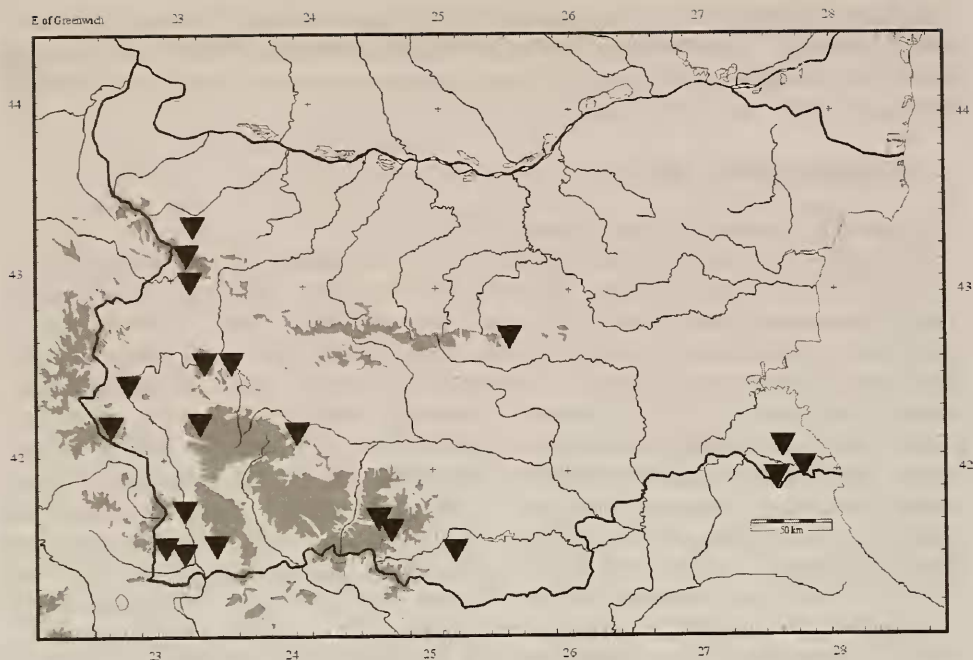


Fig. 2. Localities of *Necrodes littoralis* (Linnaeus) in Bulgaria

Bocharov leg. (1 ex.); Bistritsa, 1400-1750 m, 15.VIII.1982, (2 ex.); same locality, 15.IX.1982, both L. Penev leg. (2 ex.); **Plana Mtn.:** 19.VI.1984, T. Shtirkov leg. (1 ex.). **Konyavska Planina Mtn.:** Uglyartsy, 8.V.1980 (2 ex.). **Rila Mtn.:** Kostenets, 12.VI.1934, G. Stoyanov leg. (1 ex.). **West Rhodopes Mts.:** chalet Dobra voda, 10.VII.1983 (1 ex.).

Collections are in III-IX. Transpalaeartic species, known from Europe to Japan (PORTEVIN, 1926; NIKOLAEV & KOZMINYKH, 2002).

Phosphuga Leach, 1817

Phosphuga atrata (Linnaeus, 1758)

(= *paedemontana* Fabricius, 1775; *fusca* Herbst, 1793; *brunnea* Herbst, 1793; *cassidea* Kraatz, 1876)

Peltis fuscus Herbst var. *brunnea* Herbst: IOAKIMOV (1904: 13). *Silpha atrata* var. *brunnea*: NEDELKOV (1905: 437); *Silpha atrata* var. *cassidea*: NEDELKOV (1905: 437); PAPA ZOV (1934a: 198-199). *Phosphuga atrata*: NETOLITZKY, 1912: 159; PAPA ZOV (1934a: 198); ANGELOV (1964: 309); ANGELOV (1986: 63). *Silpha atrata*: MALKOV (1904; 1907); TSCHORBADJIEV (1924; 1932); DRENSKI (1930: 38, 54); DRENSKI (1931: 22); ANONYMOUS (1945); BURESCH & LAZAROV (1956: 229). *Silpha atrata* ab. *brunnea*: PAPA ZOV (1934a: 198).

NEW DATA: **Danube Plain:** Razgrad, V.1905, A. Markovich leg. (1 ex.). **West Stara planina Mts.:** Gintsi, 9.XII.1982 (5 ex.). **East Stara Planina Mts.:** Goren Chiflik, 16.XI.1944, N. Karnozhitsky leg. (3 ex.). **Sofia Region:**

Sofia, 5.I.1983 (5 ex.); Zapaden Park, 26.X.2002, under fallen trunk, B. Gueorguiev leg. (1 ex.). **Vitosha Mtn.:** 1200 m, 30.V.1954, V. Martino leg. (1 ex.); 1750 m, 18.V.1960, M. Josifov leg. (1 ex.); 10.V.1970, J. Horák leg. (1 ex., JHO); Simeonovo, 7.VI.1980, T. Shtirkov leg. (5 ex.); chalet Aleko, 2.VII.1982 (2 ex.). **Lozenska Planina Mtn.:** Pasarel, 14.V.1974, D. Bocharov leg. (1 ex.). **Zemenska planina Mtn.:** Skakavitsa, 2.IV.1983, J. Ganev leg (1 ex.). **Rila Mtn.:** Borovets, 2400 m, 3.IX.1925, I. Buresch leg. (1 ex.); Kostenets, 8.VII.1935, K. Tuleshev leg. (1 ex.). **Middle Struma Valley:** Kozhuh, 18.XI.1981, (1 ex.); same locality, 1.III.1982, both J. Ganev leg. (8 ex.); Sandanski, VII.1987, Kafka leg. (1 ex., JSC). **West Rhodopes Mts.:** mine "Persenk", 900-1000 m, 5.VI.1981, J. Ganev leg. (1 ex.); 3 km W Smolyan, Gerzovitsa stream valley, 4.VII.1999, J. Hájek leg. (1 ex., JRU). **Thracean Lowland:** Stara Zagora, VII.1970, S. Laibner leg. (1 ex., SL). **Strandzha Mtn.:** Ropotamo River, 22.VII.1958, G. Peshev leg. (2 ex.); Gramatikovo, 5.VIII.1983. **Black Sea Coast:** Varna, 1.IV.1943, N. Karnozhitsky leg. (1 ex.); Arkutino, 25.VI.1971, Z. Kačenka leg. (1 ex., ZK); same locality, 16.-18.IX.1988, J. Růžička leg. (1 ex., JRU); Sozopol, VI.1987, no collector's name (1 ex., JSC); Primorsko, VI.1988, M. Janata leg. (2 ex., JSC); same locality, VII.1989, M. Janata leg. (1 ex., JSC); same locality, 2.VII.1989, M. Trýzna leg. (1 ex., MT); same locality, 14.VIII.1998, K. Orszulik leg. (1 ex., KO).

Collections are in III-XII. Transpalaeartic species, known from Europe to Kuril Islands and Japan (PORTEVIN, 1926; NIKOLAEV & KOZMNYKH, 2002). The brown form of the species is mentioned as a pest on rye and other cereals (MALKOV, 1904; 1907; TSCHORBADJIEV, 1924; 1932; DRENSKI, 1930: 38), as well as on sugar beet (DRENSKI, 1931: 22; ANONYMOUS, 1945).

***Silpha* Linnaeus, 1758 (= *Peltis* Geoffroy, 1762)**

***Silpha carinata* Herbst, 1783**

(= *austriaca* Otto, 1891; *bilineata* Reitter, 1901; *carpathica* Reitter, 1901; *croatica* Obenberger, 1917)

Silpha carinata: IOAKIMOV (1904: 13); PAPAŽOV (1934a: 195); PAPAŽOV (1934b: 221); GENOV & BÍLY (1980: 29); ANGELOV (1986: 63); KODZHABASHEV & PENEV (1998: 78).

NEW DATA: **Danube Plain:** Topchii, 18.VI.1943, A. Valkanov leg. (2 ex.); Grivitsa, VII.1980, V. Popov leg. (2 ex.). **South Dobrogea:** 7.VI.1952, K. Tuleshev leg. (2 ex.); 20 km W Silistra, 30.IV.-17.VI.1987, L. Penev leg. (4 ex.); Srebarna, 17.VI.-11.VII.1987, L. Penev leg. (2 ex.); Batovo, 8.VII.1987, O. Hovorka leg. (2 ex., JRU); Dabrava, 8.VII.-21.VIII.1987, L. Penev leg. (12 ex.). **Central Stara planina Mts.:** Beklemeto Pass, 1300 m, pitfall traps in pasture, 23.VI.-22.VII.2000, Ch. Deltshv, A. Popov, Z. Hubenov leg. (6 ex.). **Vitosha Mtn.:** Vladaya, 6.V.1952, D. Bocharov leg. **Middle Struma Valley:** Kozhuh, 12.IV.1983. **West Rhodopes Mts.:** Asenovgrad, VI.1979, Z. Černý leg. (1 ex., ZC); **Black Sea Coast:** Sozopol, VI.1971, A. Olexa leg. (1 ex., AO).

Collections are in IV-VIII. Known from Europe and the Caucasus to Central Asia and Central Siberia (PORTEVIN, 1926; NIKOLAEV & KOZMNYKH, 2002).

***Silpha obscura orientalis* Brullé, 1832**

(= *lugens* Küster, 1851; *turcica* Küster, 1851)

Silpha obscura Linnaeus: HRISTOVICH (1892: 338); IOAKIMOV (1899: 766); IOAKIMOV (1904: 13); MARKOVICH (1904: 237); KOVACHEV (1905: 6); NEDELKOV (1905: 437); MALKOV (1907); MARKOVICH (1909: 7); NEDELKOV (1909: 101); NETOLITZKY (1912: 159); TSCHORBADJIEV (1924); PAPAŽOV (1934a: 195); ROUBAL (1934: 43); BURESCH & LAZAROV (1956: 229); ANGELOV (1960: 24); ANGELOV (1965: 133); GENOV & BÍLY (1980: 29); KODZHABASHEV & PENEV (1998: 78). *Silpha orientalis*: ROUBAL (1931: 362); PAPAŽOV (1934a: 196); PAPAŽOV (1934b: 221); PANIN (1941: 549); CSIKI (1943: 215). *Silpha orientalis* var. *turcica* Küster: PAPAŽOV (1934a: 197); PAPAŽOV (1934b: 221). *Silpha orientalis* ab. *lugens* Küster: PAPAŽOV (1934a: 197); PAPAŽOV (1934b: 221). *Silpha obscura orientalis*: SCHAWALLER (1980: 3); GUÉORGUIEV (2001: 170).

NEW DATA: Danube Plane: Svishtov, N. Nedelkov leg. (2 ex.); Ruse, 4.VI.1906, N. Nedelkov leg. (1 ex.); Polikraishte near Gorna Oryahovitsa, 31.III.1950, P. Drenski leg. (1 ex.); Zgalevo near Pleven, 23.V.1978, Z. Hubenov leg. (1 ex.). **South Dobrogea:** Usojte near Tervel, 15.VI.1952, P. Drenski leg. (3 ex.); 10.VII.1952, (1 ex.); 8.V.1953, both K. Tuleshkov leg. (5 ex.). **Central Stara Planina Mts.:** Karlovo, 10.IV.1939, B. Pittioni leg. (3 ex.); same locality, 15.VI.1951, leg. S. Minkova leg. (3 ex.); Kaloferska Planina Mtn., 900 m, 17.VII.1948, N. Karnozhitzky leg. (2 ex.); chalet Raj, 1600 m, 17.VIII.1970, P. Beron leg. (1 ex.); same locality, 1600 m, pitfall traps in an ecotone (forest/meadow) habitat, 21.VI.-20.VII.2000, Ch. Deltshv, A. Popov, Z. Hubenov leg. (4 ex.). **East Stara Planina Mts.:** Sliven, P. Tschorbadzhiiev leg. (2 ex.). **Lyulin Mtn.:** 7.VI.1914, I. Buresch leg. (1 ex.); 25.IV.1952, S. Minkova leg. (1 ex.); 30.VI.1959, A. Nikolov leg. (1 ex.). **Sofia Region:** Sofia, 3.V.1905, D. Ioakimov leg. (1 ex.); same locality, 20.VII.1920, Tarakliev leg. (1 ex.); place "Usojtsa" near Elin Pelin, 28.IV.1968, D. Bocharov leg. (1 ex.); same locality, 28.IV.1968, T. Shtirkov leg. (1 ex.). **Vitosha Mtn.:** Boyana, 1.V.1911, D. Ioakimov leg. (1 ex.); 21-30.VIII.1979, T. Shtirkov leg. (1 ex.). **Zemenska Planina Mtn.:** Skakavitsa, 2.IV.1983. **Transbalkan Region:** Stoletovo, 19.VI.1963, J. Král leg. (1 ex., JRU); Mirkovo near Pirdop, 26.VII.1971, T. Shtirkov leg. (1 ex.). **Sredna gora Mts.:** Koprivshtitsa, 24.V.1932, D. Papazov leg. (1 ex.); same locality, VIII.1938, I. Tsonkov leg. (2 ex.). **Upper Struma Valley:** Kyustendil, 30.VII.1909 (1 ex.). **Rila Mtn.:** Pastra, 15.IV.1928, P. Drenski leg. (1 ex.); Rilski manastir, 5.VII.1936, N. Atanasov leg. (5 ex.); same locality, 19.VIII.1955, N. Karnozhitzky leg. (1 ex.); 27.V.1954, V. Lazarov leg. (2 ex.); Kostenets, 16.VI.1955, D. Bocharov leg.; 1700 m, 12.VII.1957, N. Karnozhitzky leg. (2 ex.); VII.1967, no collector's name (3 ex., MMB, coll. Grulich). **Middle Struma Valley:** Petrich, IV.1954, G. Peshev leg. (1 ex.); Kozhuh, 12.IV.1981; Kresna, 2-4.V.1996, Z. Znamenáček leg. (1 ex., ZZ). **Maleshevska Planina Mtn.:** W Gorna Breznitsa, 1520 m, pitfall traps in an ecotone (beech forest/meadow) habitat, 15.VI-10.VII.2002, B. Guéorguiev leg (8 ex.). **Ograzhden Mtn.:** Sestrino, 27.III.1984. **Pirin Mtn.:** Vihren, 2000 m, 20.VII.1972, R. Rous leg. (4 ex., JRU); Popina Laka env., 1500 m, 5.VII.1986, J. Růžička leg. (1 ex., JRU). **Slavyanka Mtn.:** 7.VI.1936, P. Drenski leg. (1 ex.). **Rhodopes:** N. Nedelkov leg. (1 ex.). **West Rhodopes Mts.:** Bachkovo, no

date, Machulka leg. (1 ex., JRU); Chepelare, 3.VI.1902, V. Iliev leg. (4 ex.); same locality, 29.VI.1924, P. Drenski leg. (1 ex.); same locality, 27.IV.1983; same locality, 1500 m, no date, V. Švihla leg. (1 ex., JRU); Bachkovski manastir, 8.VIII.1905, D. Ioakimiv (1 ex.); Velingrad (= former Ladzhene), 31.VIII.1925, P. Drenski leg. (1 ex.); Persenk Peak, 8.V.1938, D. Papazov leg. (2 ex.); Krichim, 15.VII.1939 (1 ex.); same locality, 12.VI.1942, both I. Buresch leg. (2 ex.); Dedovo, 8.VII.1981, T. Shtirkov leg. (1 ex.); Rozhen, 1450 m, 13.VII.1981; 5 km NW Smolyan, 1500-1800 m, 2.VII.1999, J. Hájek leg. (1 ex., JRU); 3 km W Smolyan, Gerzovitsa stream valley, 1000 m, 4.VII.1999, J. Hájek leg. (1 ex., JRU). **East Rhodopes Mts.:** Haskovo, A. Markovich leg. (1 ex. sub *S. obscura* L.); same locality, 1906 (2 ex.); Harmanli, V.1985, Voříšek leg. (1 ex., JHA). **Thracean Lowland:** Plovdiv, N. Nedelkov leg. (2 ex.); same locality, 20.V.1915, I. Markvichka leg. (1 ex.); island in Maritsa River near Pazardzhik, 21.V.1901, N. Nedelkov leg. (2 ex.); Popovitsa (= former Papazli), 2.VI.1915, I. Markvichka leg. (1 ex.); Septemvri, 29.VI.1938 (1 ex.); Konare near Pazardzhik, 21.IV.1954, N. Lakov leg. (4 ex.); Botevo near Yambol, 23.VI.1979, V. Popov leg. (3 ex.); General Toshevo near Yambol, 8.VII.1988, V. Vohralík leg. (3 ex., JRU); Lyubimets, 2.VI.1996, Z. Malinka leg. (1 ex., ZMA). **Strandzha Mtn.:** Rezovo, 23.V.1923, D. Ilchev leg. (1 ex.); same locality, 15.V.1931, P. Drenski leg. (1 ex.); Ropotamo River, 22.VI.1938, I. Julius leg. (1 ex.); Zvezdets env., 700 m, no date, I. Smatana leg. (3 ex., JRU). **Black Sea Coast:** place "Gyunduz" near Varna, N. Karnozhitzky leg. (3 ex.); Meden Rid (= former Karabair), 25.VI.1910, P. Tchorbadjiev leg. (1 ex.); Maslen Nos Cap, 16.VII.1938, K. Tuleshkov leg. (2 ex.); Varna, no date, Laco leg. (8 ex., SNM); same locality, 18.VII.1942 (4 ex.); same locality, 22.V.1947 (4 ex.); same locality, 9.VII.1947 (1 ex. on a sheep); same locality, 16.IV.1950 (1 ex.); same locality, 6.VI.1954 (2 ex.); same locality, 29.V.1955, all N. Karnozhitzky leg.; Nesebar, 27.IV.1944, N. Karnozhitzky leg. (2 ex.); Zvezditsa near Varna, 2.V.1949, N. Karnozhitzky leg. (1 ex.); Levski near Varna, 16.V.1951, G. Markov leg. (2 ex.); Beloslav (= former Gebedzhe), 15.V.1952, L. Tsvetkov leg. (1 ex.); Obtochishte near Balchik, 26.VIII.1952, G. Peshev leg. (1 ex.); Sozopol, 15.VII.1969, V. Karas leg. (1 ex., VK); same locality, VI.1971, A. Olexa leg. (1 ex., AO); same locality, VII.1971, A. Olexa leg. (1 ex., AO); same locality, VII.1971, J. Král leg. (1 ex., JRU); same locality, 1.VII.1984, Z. Ivánek leg. (1 ex., JST); Lozenets, 25.VII.1971, Z. Kačenka leg. (2 ex., JRU); same locality, 18.VII.1972, Z. Kačenka leg. (3 ex., JRU); same locality, 23.VII.1975, Z. Kačenka leg. (2 ex., ZK); same locality, 10.VII.1982, M. Snížek leg. (4 ex., MS); same locality, 7.VII.1986, V. Karas leg. (2 ex., VK); Kosharitsa, III.1975, Z. Černý leg. (1 ex., ZC); Arkutino, 18.VI.1975, Z. Kačenka leg. (1 ex., ZK); Slantchev Bryag, VI.1984, Z. Černý leg. (2 ex., ZC); same locality, VII.1989, J. Jurčiček leg. (1 ex., JHA); Kiten, 1.VIII.1984, Krátký leg. (1 ex., VK); Michurin, 3.VII.1985, S. Erbenová leg. (1 ex., JSC); same locality, 3.VII.1985, Hron leg. (1 ex., RR); Ropotamo, 8.VII.1986, V. Karas leg. (2 ex., VK); Kiten env., 20.VI.-10.VII.1987, V. Beneš leg. (2 ex., JRU).

Collections are in III-VIII. Known from South-East Europe, Crete, Cyprus, Asia Minor to North Syria (PORTEVIN, 1926; SCHAWALLER, 1980). MALKOV (1907) and TSCORBADJIEV (1924) recorded this species as a beetroot pest from Sadovo.

***Silpha olivieri* Bedel, 1887**

(= *granulata*: Olivier, 1790, nec Fabricius, 1787)

Silpha olivieri: ROUBAL (1931: 437). *Silpha granulata*: GUÉORGUIEV et al. (1993: 295).

NEW DATA: Middle Struma Valley: Sandanski, 2.VI.1988 (1 ex.); same locality, VI.1988 (1 ex., JSC); same locality, 2.-7.VI.1988, all J. Mička leg. (2 ex., JRU); Melnik, 14.V.1989, Rejsek leg. (1 ex., JRE); Kresna, 2.-4.V.1996, Z. Znamenáček leg. (1 ex., ZZ). **Ograzhden Mtn.:** Lebnitsa, 24.IV.1988, R. Červenka leg. (2 ex., JSC); same locality, 24.IV.1988, R. Červenka leg. (1 ex., JRU). **Thracean Lowland:** Lyubimets, 2.VI.1996, Z. Malinka leg. (1 ex., ZMA).

Collections are in IV-VI. Mediterranean species (PORTEVIN, 1926); eastern border of its distribution range is lying in the southern part of the country. Several records from the Struma valley and a single record from the Maritsa valley confirm its presence in Bulgaria (Fig. 3).

{*Silpha puncticollis* Lucas, 1846: IOAKIMOV (1899: 766; 1904: 13). This species was cited as occurring in Bulgaria on the basis of misidentified material. *S. puncticollis* lives in the west Mediterranean: Spain, Balearic Islands, South France, Morocco, Algeria, and Tunisia (PORTEVIN, 1926). Concerning the range of the taxon, it has to be excluded from our fauna.}



Fig. 3. Localities of *Silpha olivieri* Bedel in Bulgaria

***Silpha tristis* Illiger, 1798**

Silpha tristis: ANONYMOUS (1907: 296); GENOV & BILY (1980: 27).

Known from Europe, Asia Minor, the Caucasus to Iran (PORTEVIN, 1926). Being cited only once with exact locality for the country (Fig. 4), the species seems to be not so common in the Bulgarian fauna.

***Thanatophilus* Leach, 1815 (= *Pseutopelta* Voet, 1793)**

***Thanatophilus dispar* (Herbst, 1793)**

Thanatophilus dispar: MÜLLER (1929: 8); PAPA ZOV (1934b: 221); GUÉORGUIEV et al. (1993: 295).

Palaeartic species (PORTEVIN, 1926; SCHAWALLER, 1981). Only once recorded with exact locality (MÜLLER, 1929; Fig. 4), the species needs cogent confirmation for Bulgaria. SCHAWALLER (1981: 11) mentioned the occurrence of *T. dispar* in the West Balkans.

***Thanatophilus rugosus* (Linnaeus, 1758)**

Silpha rugosa: IOAKIMOV (1904: 13); NEDELKOV (1905: 437). *Thanatophilus rugosus*: NETOLITZKY (1912: 159); MÜLLER (1929: 8); PAPA ZOV (1934a: 191); ROUBAL (1934: 43); ANGELOV (1964: 309); ANGELOV (1965: 132); SCHAWALLER (1981: 5); ANGELOV (1986: 62).



Fig. 4. Localities of *Silpha tristis* Illiger (crosspiece) and *Thanatophilus dispar* (Herbst) (pentacle) in Bulgaria

NEW DATA: Danube Plane: Razgrad, A. Markovich leg. (1 ex. sub *Silpha sinuata* F.). **Central Stara Planina Mts.:** chalet Planinets, 2.VII.1984, J. Růžička leg. (2 ex., JRU). **East Stara planina Mts.:** Eleno-Tvardishka planina, Chumerna Peak, 1500 m, 23.VII.1987, O. Hovorka leg. (1 ex., JRU). **Sofia Region:** Gorublyane, 15.V.1954, S. Minkova leg. (6 ex.). **Vitosha Mtn.:** place "Bunkera", 730 m, 14.IV.1979; chalet Aleko, 25.VII.1982 (4 ex.). **Lozenska Planina Mtn.:** Kokalyane, 2.IV.1961, D. Bocharov leg. (7 ex.). **Konyavska Planina Mtn.:** Uglyartsi, 8.V.1980 (5 ex.). **Osogovo Mtn.:** Tsumni Kamak Peak, 2000-2030 m, VIII.1994, B. Guéorguiev leg. (1 ex.). **Middle Struma Valley:** Kozhuh, 1.III.1982, J. Ganev leg. (3 ex.); same locality, 20.X.1982, J. Ganev leg. (5 ex.); Melnik, 6.VI.1984, V. Karas leg. (1 ex., VK); Stara Kresna, 6.VI.1984, V. Karas leg. (1 ex., VK); Sandanski, 16.V.1989, J. Rejssek leg. (1 ex., JRE); Kresna, 2.-4.V.1996, Z. Znamenáček leg. (1 ex., ZZ). **Ograzhden Mtn.:** Lebnitsa, 13.V.1985 (4 ex.). **East Rhodopes Mts.:** 20 km ENE Kardzhali, Perperek, 12.-14.VI.1980, R. Fencel leg. (1 ex., JRU). **Black Sea Coast:** Varna, 18.X.1942 (4 ex. on *Talpa europaea*); same locality, 7.IV.1943, N. Karnozhitsky leg. (4 ex.); place "Gyunduz" near Varna, 16.III.1947, N. Karnozhitsky leg. (11 ex. on a dead sea bird); same locality, 19.V.1949, N. Karnozhitsky leg. (7 ex. on a dead goose); same locality, 2.IV.1954, N. Karnozhitsky leg.; same locality, 27.III.1955, N. Karnozhitsky leg. (2 ex. on a dead dog); same locality, 3.IV.1955, N. Karnozhitsky leg. (1 ex. on a dead dog); same locality, 17.III.1957, N. Karnozhitsky leg. (4 ex. on a dead dog).

Collections are in III-VIII, X. Transpalaeartic species (PORTEVIN, 1926; SCHAWALLER, 1981).

***Thanatophilus sinuatus* (Fabricius, 1775)**

Pseudopelta sinuata: IOAKIMOV (1904: 13). *Silpha sinuata*: NEDELKOV (1905: 437); MARKOVICH (1909: 6). *Thanatophilus sinuatus*: NETOLITZKY (1912: 159); MÜLLER (1929: 8); PANIN (1941: 549); ANGELOV (1964: 309); SCHAWALLER (1981: 6); ANGELOV (1986: 62). *Thanatophilus sinnuatus* (sic!): PAPAISOV (1934a: 192); ANGELOV (1965: 133).

NEW DATA: Danube Plain: Razgrad, A. Markovich leg. (1 ex.); Grivitsa, VI.1980, V. Popov leg. (4 ex.). **Predbalkan:** Smirnenki Dam near Montana, 20.VI.1980. **East Stara Planina Mts.:** Komunari, 6.VII.1984, J. Růžička leg. (1 ex., JRU). **Vitosha Mtn.:** place "Bunkera", 8.V.1974. **Konyavska Planina Mtn.:** Uglyartsi, 8.V.1980 (3 ex.). **Middle Struma Valley:** Kozhuh, 20.X.1982 (1 ex.); same locality, 10.V.1983, both J. Ganev leg. (2 ex.); Melnik, 6.VI.1984, V. Karas leg. (1 ex., VK). **Ograzhden Mtn.:** Lebnitsa, 13.V.1985. **Thracean Lowland:** Topolovgrad, VI.1966, no collector's name (1 ex., MMB, coll. Grulich); Botevo near Yambol, 23.VI.1979, V. Popov leg. (1 ex.); Svilengrad, 10.VII.1981. **Strandzha Mtn.:** Malko Tarnovo, 30.VII.1983. **Black Sea Coast:** Varna, no date, Laco leg. (11 ex., SNM); place "Uzum-kum" near Varna, VIII.1941, A. Valkanov leg. (1 ex.); place "Gyunduz" near Varna, 9.IV.1954 (15 ex.); same locality, 23.III.1955, both N. Karnozhitsky leg. (3 ex. on a dolphin); Iovkovo, 20.VII.1947, N. Karnozhitsky leg. (3 ex. on *Pica* sp.); Byala, 5.V.1957, on the sea-shore, A. Valkanov leg. (1 ex.); Sluntchev Bryag, 4.VI.1964, J. Strejček leg. (1 ex., JRU); Arkutino, 18.VI.1985, M. Vrba leg. (1 ex., VM); same locality, 13.VII.1986, J. Růžička leg. (1 ex., JRU).

Collections are in III-VIII, X. Transpalaeartic species (PORTEVIN, 1926; SCHAWALLER, 1981).

NICROPHORINAE

Nicrophorus Fabricius, 1775

(= *Necrophorus*: Thunberg, 1789; *Neonicrophorus* Hatch, 1946)

Nicrophorus antennatus Reitter, 1884

Necrophorus antennatus: NEDELKOV (1905: 436); ANONYMOUS (1907: 296); PAPA ZOV (1934a: 190); PANIN (1941: 549).

NEW DATA: Sofia Region: Sofia, 27.IV.1938, I. Buresch leg. (1 ex.).

Collections are in VI-VII. Widely distributed through Central and East Europe, Asia Minor, the Caucasus to Central Asia (SIKES et al., 2002). This species seems to be rare in Bulgaria (Fig. 5).

Nicrophorus germanicus (Linnaeus, 1758)

Necrophorus germanicus: IOAKIMOV (1904: 12); KOVACHEV (1905: 6); MARKOVICH (1909: 6); PAPA ZOV (1934a: 188); PAPA ZOV (1934b: 221). *Necrophorus germanns* (sic!): NEDELKOV (1905: 437).

NEW DATA: Danube Plain: Svishtov, 20.VI.1900, D. Ioakimov leg. (1 ex.); Grivitsa, VII.1979, V. Popov leg. (2 ex.); **Belasitsa planina Mtn.:** no date,

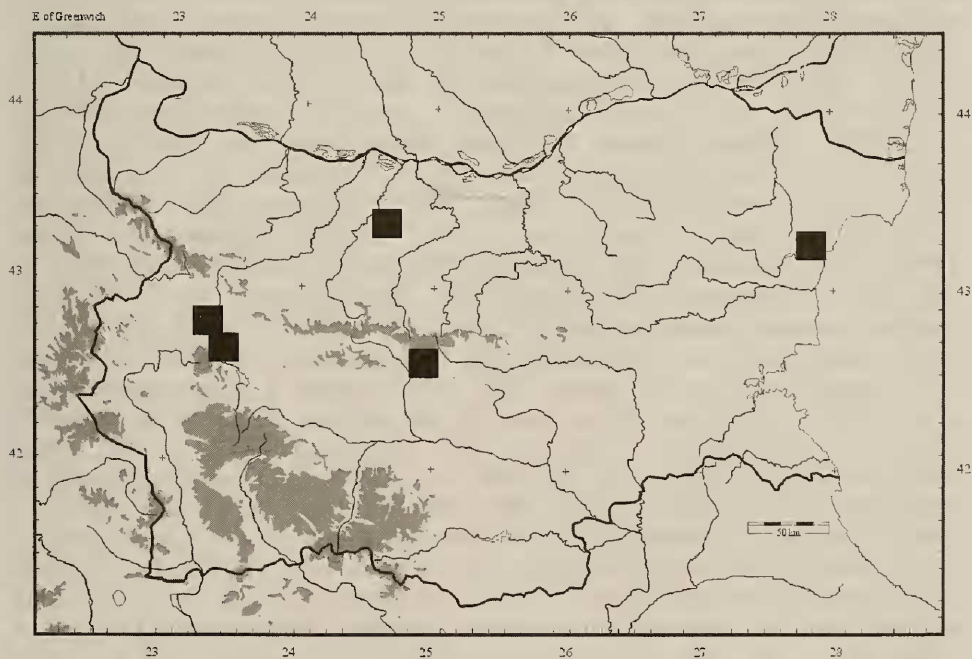


Fig. 5. Localities of *Nicrophorus antennatus* Reitter in Bulgaria

Mařan et Táborský leg. (1 ex., RR). **Black Sea Coast:** Kamen Bryag, 10.VII.1984, J. Růžička leg. (1 ex., JRU).

Collections are in IV-VII. Known from Europe, the Caucasus, Turkey, Syria to Iran (SIKES et al., 2002).

***Nicrophorus humator* Gleditsch, 1767**

Nicrophorus humator: IOAKIMOV (1904: 12); MARKOVICH (1904: 237); NEDELKOV (1905: 437); MARKOVICH (1909: 6); PAPAŽOV (1934a: 188-189); ROUBAL (1934: 43). *Nicrophorus humator*: ANGELOV (1986: 62).

NEW DATA: **East Stara planina Mts.:** Kotel, 29.IX.1924, I. Buresch leg. (1 ex.). **Sofia Region:** Sofia, 20.IV.1949, D. Bocharov leg. **Vitosha Mtn.:** above Bistritsa, 1000-1400 m, 15.IX.1982; same locality, 17.X.1982, both L. Penev leg. **Osogovo Mtn.:** place "Dve reki", 1000 m, 8.IV.1977. **Middle Struma Valley:** Kozhuh, 28.III.1982; same locality, 10.V.1982; same locality, 14.VI.1982, all J. Ganev leg. **Black Sea Coast:** Varna, 20.IV.1947 (4 ex.); same locality, 17.III.1957, both N. Karnozhitsky leg. (1 ex.).

Collections are in III-VII; IX-X. Known from Europe, North Africa, Near East, the Caucasus, Iran to Central Asia (SIKES et al., 2002).

***Nicrophorus interruptus* Stephens, 1830**

(= *fossor* Erichson, 1837; *trimaculatus* Gradl, 1882)

Nicrophorus interruptus: KOVACHEV (1905: 6); PAPAŽOV (1934a: 189); ROUBAL (1934: 43); PANIN (1941: 549). *Nicrophorus fossor*: NEDELKOV (1905: 437). *Nicrophorus vestigator* ab. *trimaculatus*: PAPAŽOV (1934a: 190); PAPAŽOV (1934b: 221); ROUBAL (1934: 43). *Nicrophorus fossor*: GUÉORGUIEV (2001: 170).

NEW DATA: **Danube Plain:** Topchii, 18.VI.1943, A. Valkanov leg. (2 ex.) (sub *N. fossor*). **South Dobrogea:** 20 km W from Silistra, 11.VII.-17.VIII.1987, L. Penev leg. (7 ex.) (sub *N. fossor*). **Predbalkan:** Reselets, 31.VII.1981. **Central Stara Planina Mts.:** Kaloferska Planina Mtn., 18.VIII.1940, K. Mandl leg. (1 ex.) (sub *N. fossor*); Shipka Pass, 5.VII.2000, M. Snížek leg. (5 ex., MS, JRU). **East Stara Planina Mts.:** Komunari, 7.VII.1984, J. Růžička leg. (2 ex., JRU). **Sofia Region:** Elin Pelin, 11.VIII.1946, D. Bocharov leg. **Vitosha Mtn.:** above Bistritsa, 1400-1700 m, 3.VII.1982, L. Penev leg. **Rila Mtn.:** 15.VII.1985, Kaplerová leg. (1 ex., OK). **Middle Struma Valley:** Kozhuh, 28.X.1981 (1 ex.); same locality, 14.VI.1982, both J. Ganev leg. (1 ex.). **Maleshevska Planina Mtn.:** W Gorna Breznitsa, 900 m, pitfall traps in oak forest, 9.VII.-23.VIII.2002, B. Guéorguiev leg. (3 ex.); W Mirevo, 310 m, pitfall traps in an ecotone (oak forest/meadow) habitat, 7.IX.-25.IX.2002, S. Lazarov & T. Ljubomirov leg. (1 ex.). **West Rhodopes Mts.:** Dorkovo, 23.VIII.1937, H. Lukov leg. (2 ex.); 10 km NW of Chepelare, 18.VIII.1980, mine "Persenk", 900-1000 m, 2.VIII.1982, J. Ganev leg. (1 ex.). **Thracean Lowland:** Botevo near Yambol, 23.VI.1979, V. Popov leg. (2 ex.). **Black Sea Coast:** Ropotamo, VII.1969, J. Gottwald leg. (1 ex., NMB, coll. Gottwald); Arkutino, 26.VI.1975, Z. Kačenka leg. (3 ex., ZK); same locality, 18.-25.VI.1985, Capouch leg. (4 ex., AH); Primorsko, 7.VII.1976, J. Mašek leg. (1 ex., JM); Varna, 1.-10.VIII.1981, V. Mikuda leg. (2 ex., VM); Zlatni Pyasatsi, VIII.1989, Krátký leg. (1 ex., JRU).

Collections are in VI-IX. Known from Europe, North Africa, Asia Minor, the Caucasus, Iran to Kazakhstan (SIKES et al., 2002). Some subsequent authors incorrectly treated the variation *trimaculata* Gradl, 1882 as an aberration of *N. vestigator* (see references above). For comments upon the priority of *N. interruptus* over *N. fossor* see SIKES et al. (2002).

***Nicrophorus investigator* Zetterstedt, 1824**

(= *ruspator* Erichson, 1837)

Nicrophorus ruspator: IOAKIMOV (1904: 13); *Nicrophorus investigator*: NEDELKOV (1905: 437).

NEW DATA: Middle Struma Valley: Kozhuh, 10.V.1983, J. Ganev leg.

Collections are in V; VII-VIII. Holarctic species (SIKES et al., 2002), not very common in Bulgaria (Fig. 6).

***Nicrophorus sepulchralis* Heer, 1841**

Nicrophorus nigricornis: PAPAŽOV (1934a: 189); PAPAŽOV (1934b: 221); ANGELOV (1965: 132); GUÉORGUIEV et. al. (1993: 295); *Nicrophorus nigricornis*: ANGELOV (1986: 61).

NEW DATA: Central Stara planina Mts.: Ambaritsa Peak, 1900 m, pitfall traps in pasture, *Juniperus* sp., 23.VI.-22.VII.2000, 1 female specimen, Ch. Deltšev, A. Popov, Z. Hubenov leg. **Belasitsa planina Mtn.:** no date, Purkyně leg. (1 ex., NBA, coll. Gottwald).



Fig. 6. Localities of *Nicrophorus investigator* Zetterstedt in Bulgaria

Collections are in VI-VIII. *Nicrophorus sepulchralis* is a typical mountain species known from the Alps and the Balkans. SIKES et al. (2002) recently removed it from synonymy under *N. nigricornis* Faldermann, 1835, known from the eastern part of Asia Minor, the Caucasus and Iran. *N. sepulchralis* appears to be rare in Bulgaria (Fig. 7), so far known to exist with certainty only in the West Rhodopes. The papers of ANGELOV (1986) confirmed previous data (ANGELOV, 1965), and the note of PAPA ZOV (1934b) is deprived of faunal data.

***Nicrophorus vespillo* (Linnaeus, 1758)**

Nicrophorus vespillo: BASSANOVICH (1891: 19); MARKOVICH (1904: 237); KOVACHEV (1905: 6); ANONYMOUS (1907: 296); MARKOVICH (1909: 6); PAPA ZOV (1934a: 190); GENOV & BILY (1980: 29); KODZHABASHEV & PENEV (1998: 78). *Nicrophorus vespillo* (sic!): IOAKIMOV (1904: 12).

NEW DATA: Danube Plain: Oryahovo, VIII.1900, D. Ioakimov leg. (1 ex.). **Sofia Region:** Sofia, 21.IX.1981. **Middle Struma Valley:** Kozhuh, 10.VI.1981 (1 ex.); same locality, 12.IV.1983 (1 ex.); same locality, 22.IV.1983, all J. Ganev leg. (1 ex.). **Black Sea Coast:** Varna, 20.IV.1947, N. Karnozhitsky leg. (3 ex. on *Erinaceus europaeus*).

Collections are in III-VI; VIII-IX. Known from Europe, Asia Minor, the Caucasus to central Asia (SIKES et al., 2002).

***Nicrophorus vespilloides* Herbst, 1784 (= *mortuorum* Fabricius, 1792)**

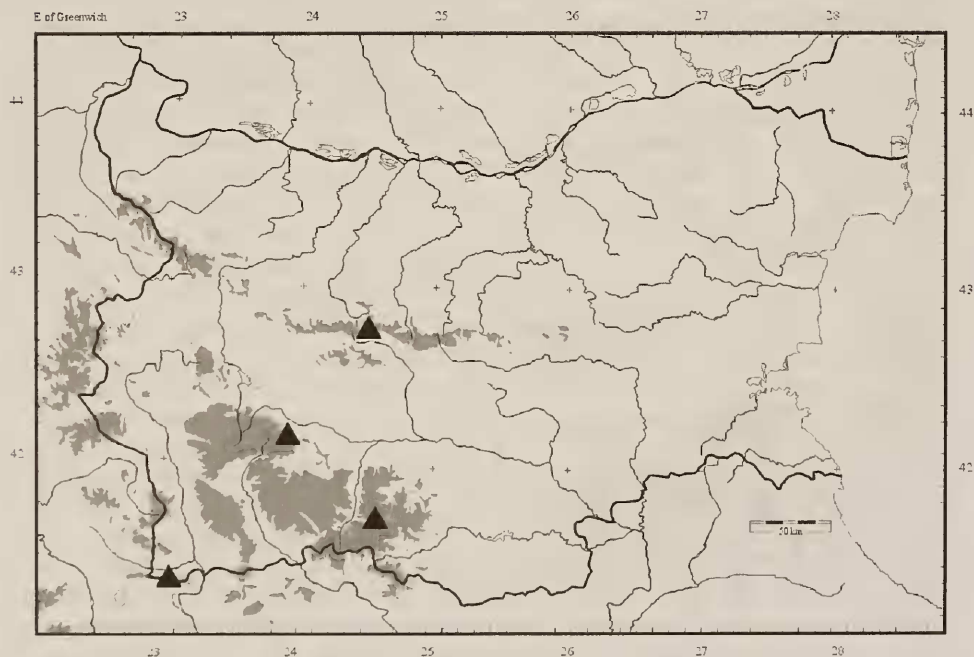


Fig. 7. Localities of *Nicrophorus sepulchralis* Heer in Bulgaria

Necrophorus mortuorum: IOAKIMOV (1899: 766); NEDELKOV (1905: 437). *Necrophorus vespilloides*: PAPAŽOV (1934a: 189); PAPAŽOV (1934b: 221); ANGELOV (1965: 132); GENOV & BILY (1980: 29); KODZHABASHEV & PENEV (1998: 78). *Nicrophorus vespilloides*: ANGELOV (1986: 62).

NEW DATA: West Stara planina Mts.: Petrohan Pass, 20.VI.1976, J. Ganev leg. (2 ex.). **Central Stara planina Mts.:** Shipka Pass, 5.VII.2000, M. Snížek leg. (1 ex., MS). **Vitosha Mtn.:** above Bistritsa, 1400-1700 m, 25.VIII.1982 (8 ex.); Bistritsa, 15.IX.1982, both L. Penev leg. **Rila Mtn.:** place "Sarugiol", 1500 m, (1 ex.); Rilski manastir, 11.VIII.1955, both N. Karnozhitsky leg. (1 ex.); VII.1967, no collector's name (1 ex., MMB, coll. Grulich). **Middle Struma Valley:** Kozhuh, 10.VI.1981, J. Ganev leg. **West Rhodopes Mts.:** Dedovo, 18.VII.1981, D. Bocharov leg. (7 ex.). **Black Sea Coast:** Maslen Nos Cap, 16.VII.1933, K. Tuleshkov leg. (1 ex.).

Collections are in V-IX. Holarctic species (SIKES et al., 2002).

Nicrophorus vestigator Herschel, 1807

(= *interruptus* Brullé, 1832, nec Erichson, 1837)

Necrophorus vestigator: IOAKIMOV (1904: 12); KOVACHEV (1905: 6); NEDELKOV (1905: 437); MARKOVICH (1909: 6); NEDELKOV (1909: 101); PAPAŽOV (1934: 190); ROUBAL (1934: 43); ANGELOV (1960: 24); ANGELOV (1964: 309).

NEW DATA: Danube Plain: Razgrad, V.1905, A. Markovich leg. (2 ex.). **East Stara Planina Mts.:** Sliven, 18.VIII.1908, Rambousek leg. (1 ex., RR); Komunari, 6.VII.1984, J. Růžička leg. (1 ex., JRU). **Sofia Region:** Novi Iskar (= former Kurilo), 6.IV.1947, D. Bocharov leg. **Middle Struma Valley:** Kozhuh, 10.VI.1981; same locality, 10.V.1983, both J. Ganev leg. **East Rhodopes Mts.:** Leshnikovo, 14.VI.1975 (1 ex., ZZ); Biser, 16.VI.1975, both Z. Znamenáček leg. (1 ex., ZZ); Harmanli, 25.-29.VI.1975, D. Král leg. (1 ex., JRU). **Thracean Lowland:** Botevo near Yambol, 23.VI.1979, V. Popov leg. (1 ex.). **Black Sea Coast:** Varna, 18.VII.1942 (3 ex. on *Talpa europaea* and hamster); same locality, 26.V.1946, both N. Karnozhitsky leg. (4 ex. on *Erinaceus europaeus*); Arkutino, 18.-25.VI.1985, Capouch leg. (1 ex., AH); Nesebar env., 20.VI.-6.VII.1965, K. Ermisch leg. (1 ex., ZMHB).

Collections are in III-VII. Known from Europe, Asia Minor, Near East to West Siberia and Kashmir (SIKES et al., 2002).

Contemporary state and problems of the silphid-fauna in Bulgaria

A bibliographical review of carrion beetles in Bulgaria has been made. Besides, more than 370 new finds from over 200 localities have been added for 21 taxa. As a result, 23 spp. (from ca. 25-26 known in Southeast and Central Europe) have been established. Five of them, being rare species (GUÉORGUIEV et al., 1993) or species long ago recorded, e.g. *Aclypea opaca* (Linnaeus, 1758), *Necrodes littoralis* (Linnaeus, 1758), *Silpha olivieri* Bedel, 1887, *Nicrophorus antennatus* (Reitter, 1884) and *N. sepulchralis* Heer, 1841, have been confirmed for Bulgaria. The West Mediterranean *Silpha puncticollis* Lucas, 1846, cited by IOAKIMOV (1899; 1904), is excluded from the list of Bulgarian

beetles. Several problems could be of interest to both the carrion beetle specialists and the Bulgarian coleopterologists. The species *Ablattaria arenaria* (Kraatz, 1876), indicated for the East Balkans (SCHAWALLER, 1979: 9, Abb. 1) but not properly cited for Bulgaria and not included in the present list, requires reliable evidence. Other two species, *Silpha tristis* Illiger, 1798 and *Thanatophilus dispar* (Herbst, 1793), are both known from single localities and need further confirmation.

Chorotypes of Bulgarian Silphidae

Regarding their present distribution, the Bulgarian species could be placed under various kinds of chorotypes (Table 1).

Table 1.

Chorotypes of the Bulgarian species and subspecies of Silphidae

SPECIES AND SUBSPECIES	CHOROTYPES
<i>Ablattaria laevigata</i> (Fabricius, 1775)	European - West Turanian
<i>Aclypea opaca</i> (Linnaeus, 1758)	Holarctic
<i>Aclypea undata</i> (O. F. Müller, 1776)	West Palaearctic
<i>Dendroxena quadrimaculata</i> (Scopoli, 1772)	West Palaearctic
<i>Necrodes littoralis</i> (Linnaeus, 1758)	Transpalaeartic
<i>Nicrophorus antennatus</i> Reitter, 1884	West Palaearctic
<i>Nicrophorus germanicus</i> (Linnaeus, 1758)	West Palaearctic
<i>Nicrophorus humator</i> Gleditsch, 1767	West Palaearctic
<i>Nicrophorus interruptus</i> Stephens, 1830	Transpalaeartic
<i>Nicrophorus investigator</i> Zetterstedt, 1824	Holarctic
<i>Nicrophorus sepulchralis</i> Heer, 1841	European Mountain
<i>Nicrophorus vespillo</i> (Linnaeus, 1758)	West Palaearctic
<i>Nicrophorus vespilloides</i> Herbst, 1784	Holarctic
<i>Nicrophorus vestigator</i> Herschel, 1807	West Palaearctic
<i>Oiceoptoma thoracicum</i> (Linnaeus, 1758)	Transpalaeartic
<i>Phosphuga atrata</i> (Linnaeus, 1758)	Transpalaeartic
<i>Silpha carinata</i> Herbst, 1783	West Palaearctic
<i>Silpha obscura orientalis</i> Brullé, 1832	South-east European - West Turanian
<i>Silpha olivieri</i> Bedel, 1887	Mediterranean
<i>Silpha tristis</i> Illiger, 1798	West Palaearctic
<i>Thanatophilus dispar</i> (Herbst, 1793)	Transpalaeartic
<i>Thanatophilus rugosus</i> (Linnaeus, 1758)	Transpalaeartic
<i>Thanatophilus sinuatus</i> (Fabricius, 1775)	Transpalaeartic

The various chorotypes could be united in 5 main complexes: I. Holarctic (Holarctic chorotype) - 3 spp.; II. Palaearctic (Transpalaeartic chorotype) - 7 spp.; III. West-central Palaearctic (West Palaearctic, European - West Turanian chorotypes) - 11 spp.; IV. European (European-Mountain chorotype) - 1 sp.; V. Mediterranean (Mediterranean chorotype) - 1 sp.

Out of the total number of 23 species of Silphidae known from the region investigated, the most numerous are the taxa with Transpalearctic and West Palearctic ranges - more than two-thirds of species. Interestingly, the carrion beetles from both the European and the Mediterranean complexes are scanty, both with only a single species. The predominance of the wide distributed Palearctic taxa in Bulgaria hints at the relatively recent geographical expansion of group. This could be in support of the Newton's opinion. According to it (NEWTON, 1997: 146-147) the species from Silphidae are relatively younger in terms of phylogenesis than other "carrion beetles" known (Agryrtidae, some Leiodidae).

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Ревизиран списък на българските бръмбари-мършояди (Coleoptera: Silphidae)

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(Резюме)

Настоящата работа се основава както на непубликувани данни, така и на преглед на познатата литература. Установени са 23 вида и подвиди от различни региони на България. За 21 от тях са представени над 370 нови находки от повече от 200 локалитета. *Aclypea opaca* (Linnaeus, 1758), *Necrodes littoralis* (Linnaeus, 1758), *Silpha olivieri* Bedel, 1887, *Nicrophorus antennatus* (Reitter, 1884) и *N. sepulchralis* Heer, 1841, познати досега само от единични находки, са потвърдени за българската фауна. *Silpha tristis* Illiger, 1798 и *Thanatophilus dispar* (Herbst, 1793), познати от по-стари данни, се нуждаят от по-нататъшно изследване. Западносредиземноморският вид *Silpha puncticollis* Lucas, 1846 е изключен от списъка на българската фауна. Същото се отнася и за *Ablattaria arenaria* (Kraatz, 1876), указан без конкретни находища за източните райони на Балканския полуостров. Определени са зоогеографските категории на всички видове и подвидове.